



North Dakota's Radiation Control Program

The Radiation Control Program monitors the development and use of ionizing radiation sources to protect the health and safety of North Dakotans and the environment. The program licenses radioactive material users and registers x-ray facilities. Staff members track 63 specific radioactive material licenses and more than 700 x-ray registrants, and perform periodic inspections of both types of radiation users within the state.

The North Dakota Department of Health (NDDoH) also has responsibility for response to hazardous material incidents involving radioactive material (RAM). Personnel assigned to the Radiation Control Program in the Division of Air Quality are available to assess the human exposure potential and environmental impact of incidents or accidents involving RAM.

Jurisdiction Over Radioactive Material

Radioactive material is regulated by the NDDoH. Depending on the radionuclide, quantity, and the form, a license is required in order to manufacture, produce, transfer, receive, acquire, own, possess, store, or use RAM. The U.S. Nuclear Regulatory Commission (NRC) is authorized to enter into agreements with the governor of any state providing for the discontinuance of the regulatory authority of the NRC within that state. Under this agreement, the state assumes regulatory authority for the use of RAM. North Dakota entered into such an agreement with the NRC Sept. 1, 1969, and is known as an Agreement State. Minnesota, South Dakota and Montana are among the states in our area which remain under the jurisdiction of the NRC and are not considered Agreement States.

Personnel

Radiation Control Program staff located at 1200 Missouri Avenue in Bismarck includes two X-Ray Machine & Mammography staff – Warren Freier, RT(RT)(R)(T)(QM) and James Lawson, RT(R); and two Radioactive Material Licensing & Inspection staff – Jim Killingbeck and Justin Griffin, P.E. The manager of the Radiation Control Program is Ken Wangler, P.E.

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State employees (such as laboratory personnel), licensed personnel and trained volunteers also may become involved in a response to a radiological incident.

Capabilities

Staff personnel are trained in radiation physics, radiation safety and protection, radiation biology, transportation of radioactive material, use of detection instruments, mathematics pertaining to the use and measurement of radioactivity, and radiological emergency response procedures.

The program maintains a number of calibrated portable radiation detection instruments for use during inspections and incident response. These instruments can be used to locate lost sources of radiation and to determine levels of ambient radiation and/or contamination at the scene of an incident.

Other agencies, such as the main laboratory of the Chemistry Division and universities such as NDSU and UND, have agreed to work in cooperation with the Radiation Control Program (RCP) to provide analysis of samples to verify the presence or absence of radioactive contamination in the event of an accident or emergency.

The RCP also will consult with and obtain support from federal agencies such as the NRC, the U.S. Environmental Protection Agency, the U.S. Department of Energy, the U.S. Department of Transportation, the Federal Emergency Management Agency and the new Department of Homeland Security. Ⓜ



Response to Transportation Accidents Involving RAM

Millions of packages of radioactive material (RAM) are transported in the United States annually. Most shipments consist of medical and industrial products. Other shipments include nuclear power plant fuel, nuclear weapons and weapons material, and radioactive waste generated by hospitals, laboratories, reactors and military facilities.

Because of the sheer number of radioactive material shipments (2.8 million shipments in 1998), transportation accidents are the most common type of incident involving RAM. Despite their frequency, however, there have been no known serious radiation exposures resulting from transportation accidents. This is due largely to the nature of the radioactive material transported and the use of protective packaging commensurate with the degree of potential hazard of the RAM contained.

Accidents Involving Radioactive Material

First responders (i.e., firefighters, law enforcement, etc.) may not be aware that the accident involves RAM until they arrive at the scene. Information sources available at an accident site that may indicate the presence of RAM include:

- Package labels.
- Package markings.
- Vehicle placards.
- Shipping papers.

Package Labels

Nearly all packages containing RAM are required to be labeled "RADIOACTIVE." Three basic labels are used to identify RAM packages. All of the labels bear the distinctive tri-blade symbol, which is universal for the identification of radioactivity or radiation.



Tri-Blade Symbol

Did You Know?

Sleeping next to someone for eight hours a day will result in a radiation exposure of almost 2 millirem per year due to the naturally occurring potassium-40 in the other person's body.

By looking at a package's label, one can determine the hazards associated with it without the aid of a radiation detection device.

The Radioactive White-I label is used on packages that have a maximum dose rate of 0.5 mR/hr on any exterior surface.



Radioactive White-I Label

The Radioactive Yellow-II label is used on packages that have a maximum dose rate of 50 mR/hr on any exterior surface and a maximum of 1 mR/hr at one meter from the package.



Radioactive Yellow-II Label

The Radioactive Yellow-III label is used on packages with a maximum dose rate of 200 mR/hr at any exterior surface and a maximum of 10 mR/hr at one meter from the package.



Radioactive Yellow-III Label

In some very exceptional situations, the maximum dose rate permitted on a package may be up to 1000 mR/hr on contact with the exterior surfaces of the package.

The labels are white except for the upper half of the Yellow-II and Yellow-III labels, which are yellow. Note that in all cases, the radiation level at the surface of an unbroken package is no more than 1000 mR/hr. If the package integrity is broken, the hazard might be greater due to the loss of shielding provided by the packaging material or due to the possibility of a contamination hazard.

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Response to Transportation Accidents Involving RAM (cont.)

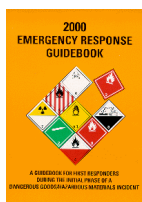
Radioactive labels also list the type of radioactive nuclide contained and the amount of activity. This additional information is valuable to radiation protection specialists in determining the degree of hazard present.

Package Markings

Generally, every package labeled as radioactive also will have a marking showing a certain “proper shipping name” and a four-digit United Nations (UN) identification number. With the proper shipping name or UN number, emergency responders can determine the proper response actions to be taken by referring to the Emergency Response Guidebook.

**NRC USA/9263/B(U)-85
RADIOACTIVE MATERIAL
TYPE B(U) PACKAGE,
NONFISSILE OR FISSILE
EXCEPTED, UN 2916**

Package Marking Example



Emergency Response Guidebook

Vehicle Placards

Just as labels and markings are used to show the quantity of radioactivity in a package and to indicate the level of radiation emitted, placards are standard signs affixed to the exterior of a vehicle or freight container to identify hazards associated with the cargo.

Any vehicle carrying a package with a Yellow-III label is required to bear the placard shown below. The radioactive placard must be yellow on the top half with the tri-blade symbol. The bottom half must be white with the word “RADIOACTIVE” inscribed in black. Vehicle placards can help a great deal following an accident, particularly for a closed vehicle where the packages have remained in the vehicle.



Radioactive Placard

Blast from the Past

In 1955, a security guard was to accompany radiation safety staff into an exclusion area after a weapons test. When the guard arrived where he was to meet the safety staff, he found that they had already left and he went to find them. Somehow, he lost his way and drove beyond the established safety point towards ground zero. When it became apparent that he could not find the radiation safety staff he contacted his headquarters by radio and notified them of his position. He was immediately ordered out of the area. The guard's film badge indicated he had received a dose of 39 rem.

Placards are used by emergency response personnel to determine the appropriate actions to be taken when first arriving at an accident scene. Emergency response actions such as firefighting strategies, spill or leak confinement techniques and first aid considerations are keyed by a given hazardous material placard, just as they are by the proper shipping name and UN number on the package markings.

Shipping Papers

A fourth source of information about a radioactive material shipment available at the scene of a transportation accident is shipping papers (or the bill of lading). With certain exceptions, shipping papers that identify hazardous material are required to be kept in the cab of a motor vehicle, in the possession of a train crew member, in a holder on the bridge of a sailing vessel or in the possession of an aircraft pilot.

Shipping papers list all of the information provided by the package labels and markings. They also provide additional information, including the physical and chemical form of the material, the name and address of the shipper, an emergency contact phone number and emergency response information.

On-Scene Accident Response

The three main actions to be taken before the arrival of trained emergency response personnel are helping injured personnel, notifying the proper authorities and isolating the area.

HELP - NOTIFY - ISOLATE

Help for injured individuals should not be delayed out of concern for radiological hazards. The responder should perform life-saving rescues and provide emergency first aid to the extent qualified.

Using any form of communication available, an individual at the scene of an accident should notify the

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Response to Transportation Accidents Involving RAM (cont.)

authorities. It is important to give the greatest amount of detail possible when calling for help. Important information includes:

- The location and nature of the accident.
- The cargo (if easily identified by the placards or package labels).
- Your name and the phone number from where you are calling.
- The number of people injured and the seriousness of injuries.
- The actions being taken at the time of the call.

Once injured individuals have been helped and the authorities have been notified, the accident scene should be isolated. This is needed to prevent the spread of low-level radioactive contamination and to prevent unnecessary radiation exposure to individuals.

Radioactive materials released at an accident site, even at low levels, can result in very small but still detectable levels of contamination being spread a great distance. The spread of contamination can be controlled by limiting access to and egress from the accident site. Any detectable amount of contamination, however insignificant, can prove to be of great concern to the public and the news media.

It is important to treat everything that has been near the accident as potentially contaminated until it has been verified by qualified radiation protection personnel to be free of contamination. Individuals who have contacted potentially contaminated material should wash the affected area but remain on-hand until they have been checked by qualified personnel. **Only qualified personnel should attempt to clean up a spill of any hazardous material – radioactive or not.**

Very severe accidents involving highly radioactive Type B shipments are improbable but not impossible. Such an accident might require an extensive response if the package were severely damaged and involved a release of a significant fraction of its contents.

If a radioactive material package has been badly damaged, or if you suspect that it is leaking, do not panic. The steps to take are simple:

- Stay away from the package and do not touch it.
- Keep other people away from the area (upwind and uphill).
- Tell anyone who may have touched the package to wash and remain on-hand to be checked by radiation protection specialists.
- If you touched the package or objects near it, wash your hands.
- Prohibit eating, drinking and smoking in the area.
- Maintain control until arrival of radiation protection specialists.

If you have any questions about the information in this newsletter, need information on radiation safety training or have concerns about radiation protection in general, please contact the Radiation Control Program by calling 701.328.5188.

Radioactive News is a publication of:

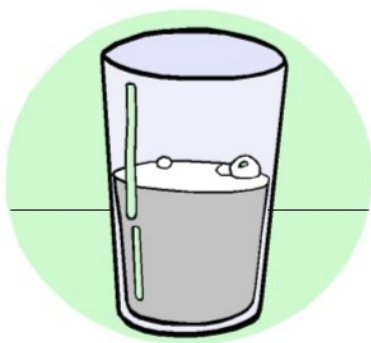


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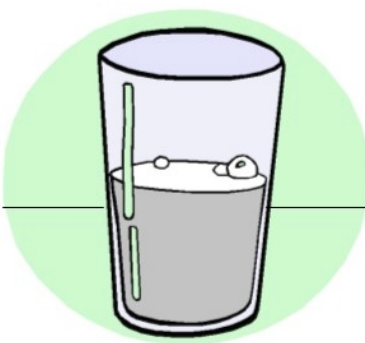
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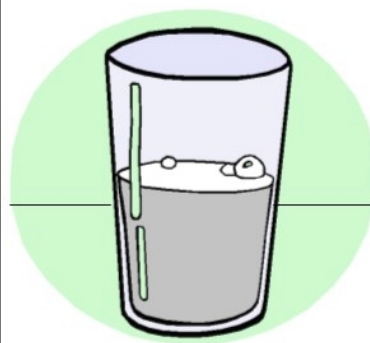
A pessimist would see this water glass as half empty...



An optimist would see it as half full...



Your Radiation Safety Officer would see it as 80 parts per billion radon.



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